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Capital Investments of the World Petroleum Industry

1978

CHASE



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CHASE

Energy Economics



FOREWORD

For many years the Energy Economics Division of The Chase Manhattan Bank has conducted a continuous and detailed study of the financial performance of a large number of petroleum companies. The combined operations of these organizations constitute a major proportion of the worldwide activities of the petroleum industry, and their financial performance, therefore, is a significant indication of the probable experience of the overall industry.

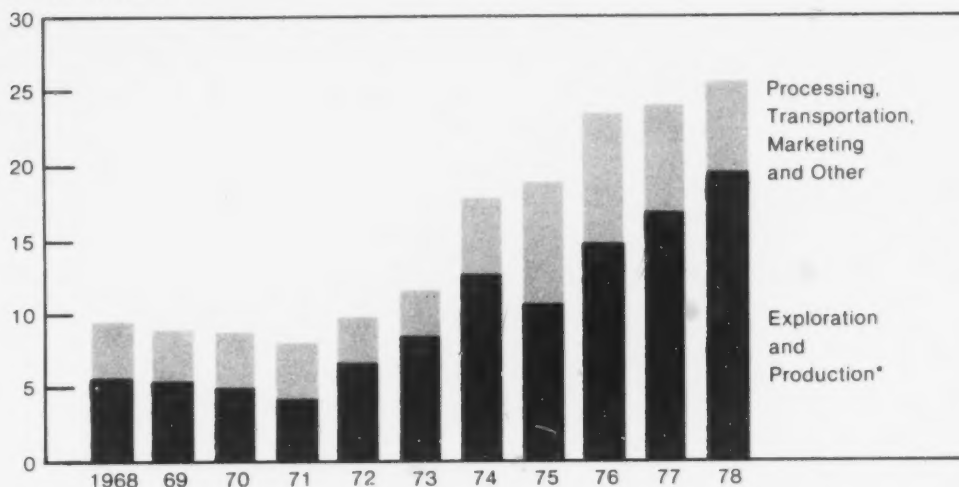
Additional data have been obtained from surveys of a great many investor and other government owned operating entities, and the sum of all the information gained has provided a base from which we have derived a reliable estimate of the worldwide capital investments of the petroleum industry.

All data on the petroleum industry have been obtained as described above.

WORLDWIDE CAPITAL AND EXPLORATION EXPENDITURES

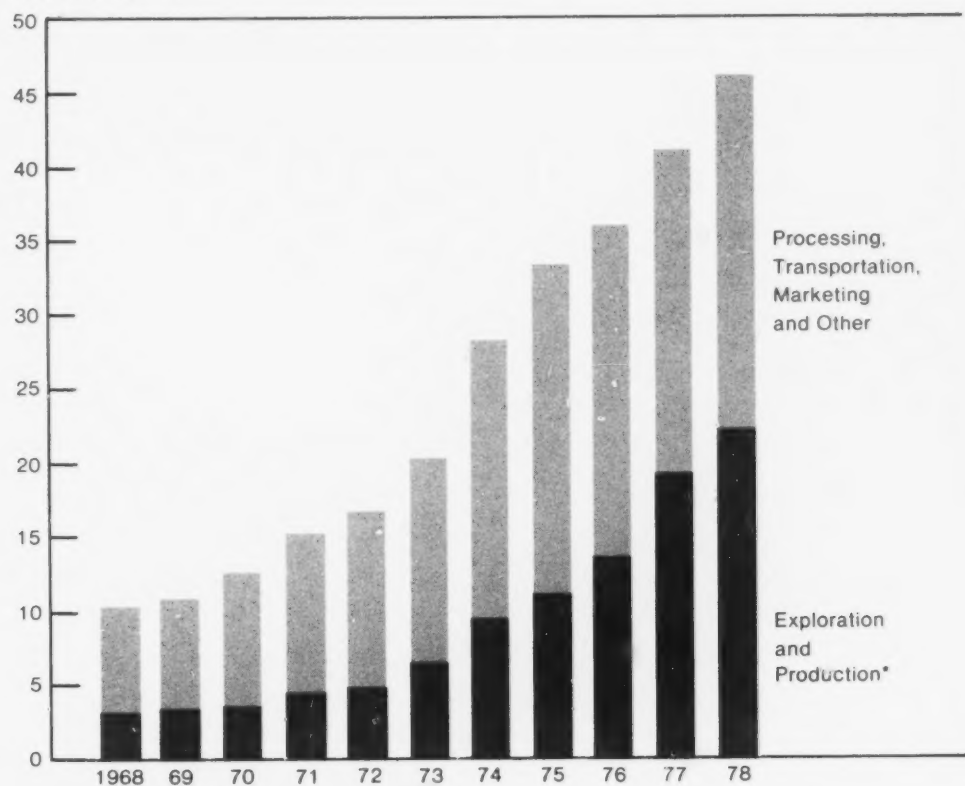
United States

billions of dollars



Rest of World**

billions of dollars



*Includes Natural Gas Liquids Plants

**Excludes Communist Countries

Highlights of CAPITAL EXPENDITURES IN 1978

- The 1978 capital and exploration expenditures for the world petroleum industry (excluding Communist countries) increased by 11.4% to \$72.4 billion.
- In the United States, total capital and exploration expenditures increased by 10%, driven primarily by accelerating drilling costs. These expenditures accounted for 36.5% of the industry's total world investment, compared to 37% in 1977.
- Capital and exploration expenditures in the rest of the world showed continued strong growth, increasing by 12.3% over 1977 and accounting for 63.5% of the total capital invested.



- On a functional basis, increases ranging from 4% to 29% were recorded in each major segment except transportation, where both tanker and pipeline investments declined moderately.
- Expenditures for production, totaling \$37.7 billion, accounted for more than one-half the industry's overall investment and registered the largest increase of any segment — \$5.2 billion. Of that increase, the largest area gain — \$2.5 billion — occurred in the United States.
- Except for a decrease of \$275 million in the Middle East, all areas recorded larger outlays for production purposes in 1978 than a year earlier.

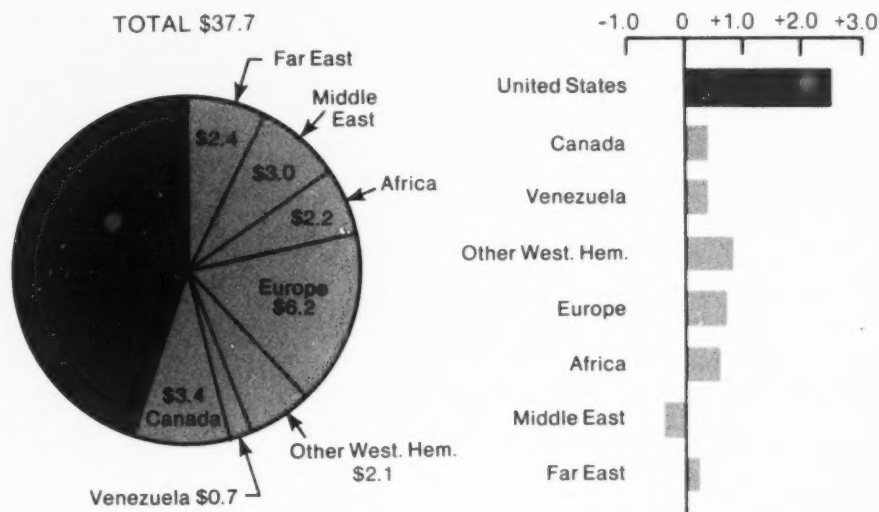
CAPITAL EXPENDITURES—PRODUCTION

Year 1978

billions of dollars

Change from 1977

billions of dollars



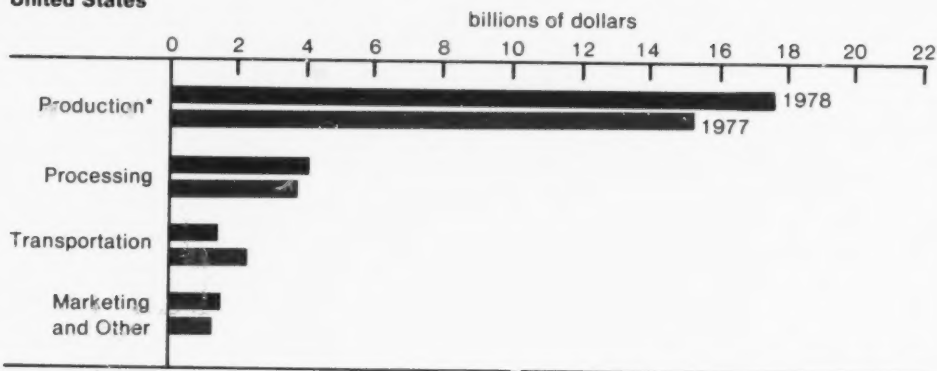


- The \$17.7 billion allocated to finding and developing crude oil and natural gas in the United States was only slightly less than the total spent for the same purpose in the rest of the world.
- Expenditures for refineries rose substantially, to \$10.7 billion, \$2.4 billion more than in 1977. All areas registered gains, except for an insignificant decline in the Other Western Hemisphere area.
- The dramatic increases recorded in each of the four prior years for chemical plants did not continue in 1978. These outlays rose by only \$275 million, to \$6.7 billion.

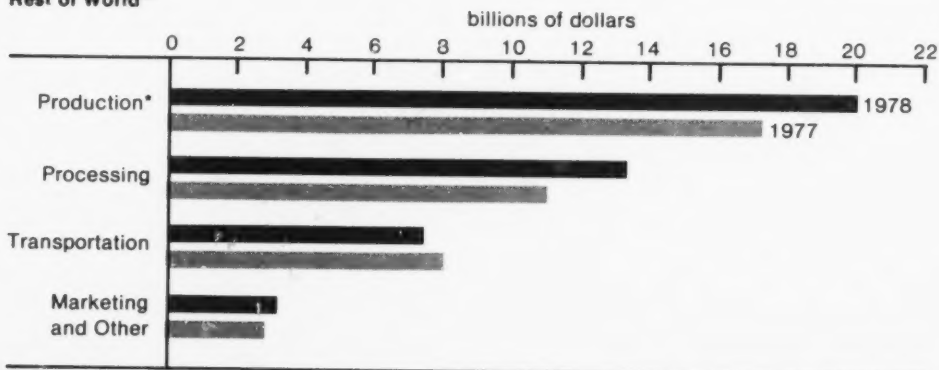
- The \$8.7 billion expended for transportation facilities (pipelines and tankers) represented only 13% of the world total, the lowest proportion for transportation purposes in two decades. As recently as 1975 and 1976, the transportation segment accounted for 31% and 29%, respectively.
- Increasing by \$570 million, the marketing segment recorded its second consecutive major gain, from \$2.7 to \$3.2 billion, after registering year-to-year reductions since 1971. The largest increases occurred in the United States and Western Europe.

**WORLDWIDE CAPITAL EXPENDITURES
BREAKDOWN BY FUNCTION — 1978 vs. 1977**

United States



Rest of World**

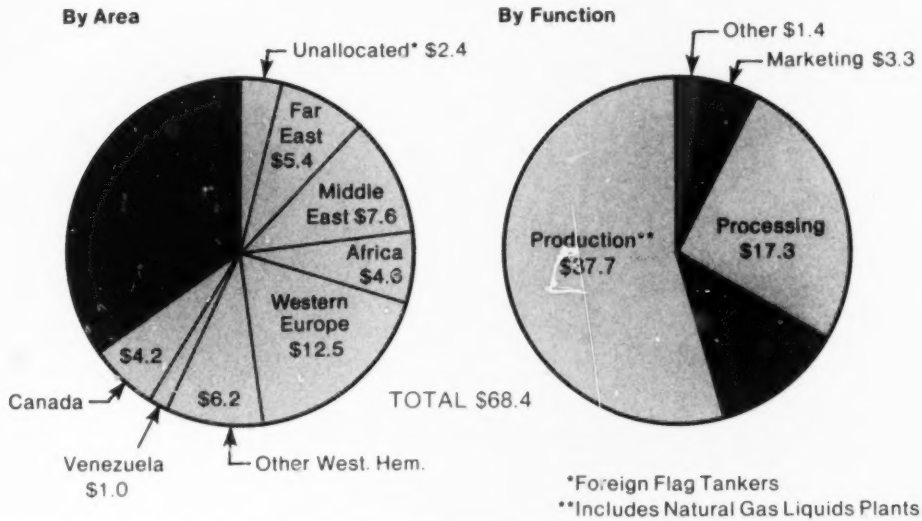


*Includes Natural Gas Liquids Plants

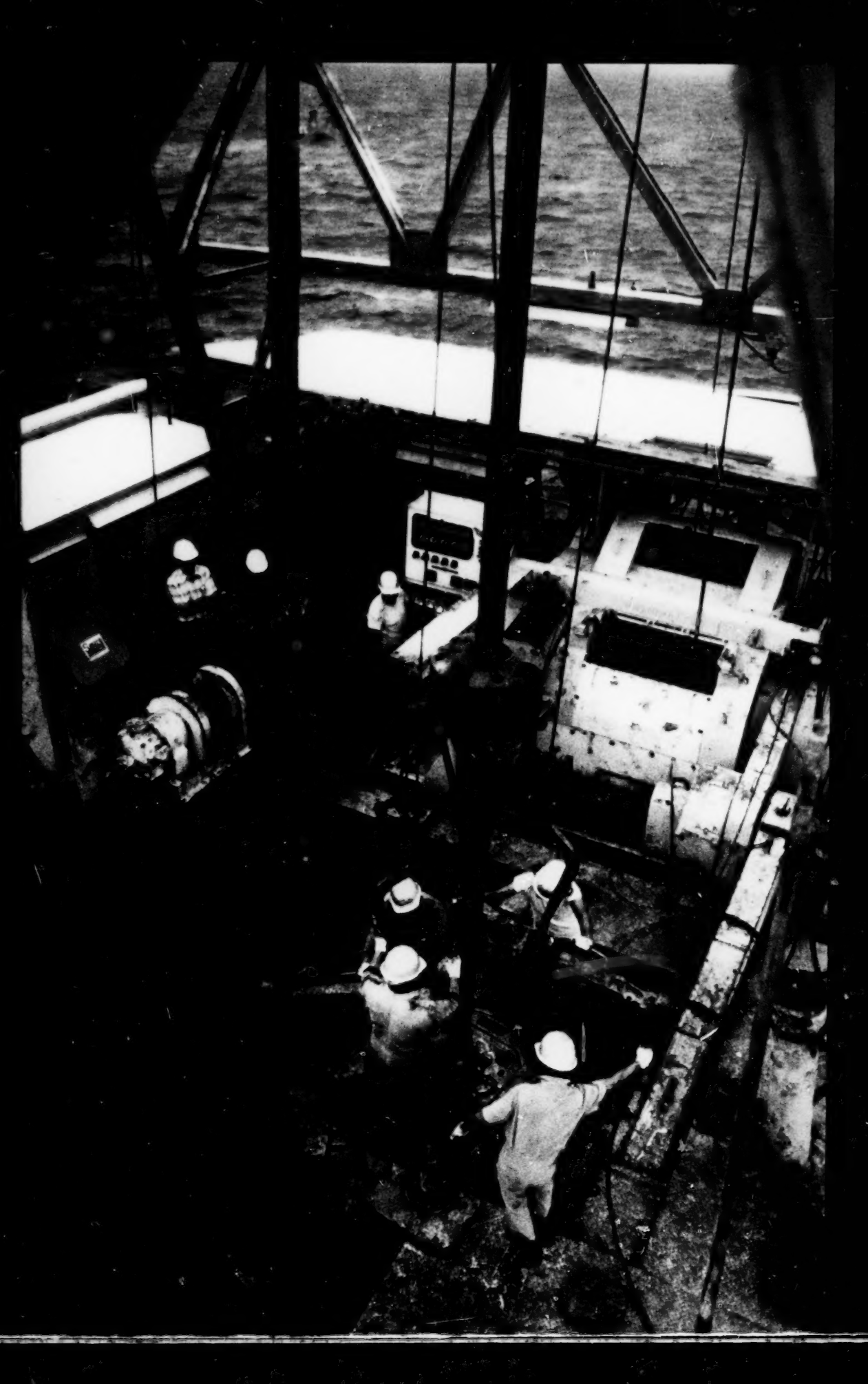
**Excludes Communist Countries

WORLDWIDE CAPITAL EXPENDITURES — 1978

billions of dollars



- Geographically, all areas posted higher total investments, except for a slight downturn in the Middle East.
- Total outlays in the United States were \$24.5 billion, 36% of the industry's worldwide total, followed by \$12.5 billion (18%) in Western Europe and \$7.6 billion (11%) in the Middle East.
- In Canada and the United States, outlays for production (\$3.4 billion and \$17.7 billion, respectively) continued to dominate capital spending, far exceeding the industry average of 55% for production (\$37.7 billion, versus total expenditures of \$68.4 billion).
- In the Middle East, after several years of strong growth, expenditures for processing (\$3 billion) equaled production expenditures and dramatically exceeded the industry average of 25% for processing (\$17.3 billion versus \$68.4 billion).



APPENDIX

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Photographs used in this report were furnished through the courtesy of Exxon Corporation and Mobil Corporation.

SCHEDULE 1 CAPITAL AND EXPLORATION EXPENDITURES

Year 1978

	<i>United States</i>	<i>Canada</i>	<i>Venezuela</i>
	<i>Million Dollars</i>		
Crude Oil and Natural Gas.....	17,325	3,200	700
Natural Gas Liquids Plants.....	325	150	5
Total Production.....	17,650	3,350	705
Pipe Lines.....	750	135	20
Tankers.....	600	0	0
Refineries.....	1,750	400	175
Chemical Plants.....	2,300	125	0
Marketing.....	950	165	25
Other.....	475	65	60
<i>Total Capital Expenditures</i>	24,475	4,240	985
<i>Geological & Geophysical Expense and Lease Rentals</i>	1,975	500	60
CAPITAL & EXPLORATION EXPENDITURES	26,450	4,740	1,045

SCHEDULE 2 GROSS INVESTMENT IN FIXED ASSETS

December 31, 1978

Crude Oil and Natural Gas.....	98,025	14,900	6,200
Natural Gas Liquids Plants.....	4,690	1,690	320
Total Production.....	102,715	16,590	6,520
Pipe Lines.....	18,100	1,865	530
Tankers.....	3,050	0	0
Refineries.....	21,750	4,125	1,000
Chemical Plants.....	16,400	850	0
Marketing.....	14,050	2,565	210
Other.....	4,070	525	165
TOTAL GROSS INVESTMENT	180,135	26,520	8,425

SCHEDULE 3 NET INVESTMENT IN FIXED ASSETS

December 31, 1978

Crude Oil and Natural Gas.....	63,231	12,085	1,575
Natural Gas Liquids Plants.....	1,935	1,165	145
Total Production.....	65,166	13,250	1,720
Pipe Lines.....	12,955	1,060	30
Tankers.....	1,680	0	0
Refineries.....	9,740	2,445	240
Chemical Plants.....	8,970	525	0
Marketing.....	6,965	1,420	75
Other.....	2,300	435	130
TOTAL NET INVESTMENT	107,776	19,135	2,195

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	<i>United States</i>	<i>Canada</i>	<i>Venezuela</i>
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<i>TOTAL NET INVESTMENT</i>	107,776	19,135	2,195

<u>Other Western Hemisphere</u>	<u>Western Europe</u>	<u>Africa</u>	<u>Middle East</u>	<u>Far East</u>	<u>Unallocated</u>	<u>Free World</u>
<i>Million Dollars</i>						
1,900	5,975	1,275	1,550	1,750	0	33,675
250	200	900	1,500	700	0	4,030
2,150	6,175	2,175	3,050	2,450	0	37,705
1,550	950	625	1,400	350	0	5,780
0	0	0	0	0	2,350	2,950
1,000	2,500	1,175	2,050	1,625	0	10,675
1,075	1,500	400	1,000	250	0	6,650
225	1,100	200	50	525	0	3,240
175	250	75	100	175	0	1,375
6,175	12,475	4,650	7,650	5,375	2,350	68,375
200	475	375	150	300	0	4,035
6,375	12,950	5,025	7,800	5,675	2,350	72,410
10,125	22,850	7,325	11,275	7,050	0	177,750
900	850	2,725	3,725	2,700	0	17,600
11,025	23,700	10,050	15,000	9,750	0	195,350
5,675	6,425	3,400	6,850	1,750	0	44,595
0	0	0	0	0	54,925	57,975
10,325	26,375	4,150	6,575	18,000	0	92,300
3,800	13,075	925	2,325	2,325	0	39,700
2,575	14,550	2,050	670	6,125	0	42,795
1,050	2,100	400	1,350	875	0	10,535
34,450	86,225	20,975	32,770	38,825	54,925	483,250
5,585	21,195	5,150	6,745	5,290	0	120,856
665	700	2,310	3,510	2,415	0	12,845
6,250	21,895	7,460	10,255	7,705	0	133,701
4,265	5,055	2,400	5,215	1,380	0	32,360
0	0	0	0	0	44,900	46,580
7,295	14,815	3,210	5,000	11,425	0	54,170
3,090	8,900	885	2,210	1,525	0	26,105
810	5,310	720	165	2,980	0	18,445
850	1,830	305	890	690	0	7,430
22,560	57,805	14,980	23,735	25,705	44,900	318,791

SCHEDULE 4 CAPITAL AND EXPLORATION EXPENDITURES

	1968	1969	1970	1971
	<i>Million Dollars</i>			
WORLD*				
Crude Oil and Natural Gas.....	6,875	7,075	6,650	6,520
Natural Gas Liquids Plants.....	585	465	580	695
Pipe Lines.....	1,080	910	850	1,200
Tankers.....	1,650	2,050	2,575	2,875
Refineries.....	2,950	3,210	4,000	4,755
Chemical Plants.....	1,480	1,310	1,525	1,535
Marketing.....	2,665	2,805	3,220	3,380
Other.....	615	550	725	840
<i>Total Capital Expenditures</i>	17,900	18,375	20,125	21,800
<i>Geological & Geophysical Expense and Lease Rentals</i>	1,330	1,380	1,340	1,395
COMBINED	19,230	19,755	21,465	23,195
UNITED STATES				
Crude Oil and Natural Gas.....	4,675	4,525	4,110	3,185
Natural Gas Liquids Plants.....	250	225	225	200
Pipe Lines.....	425	300	450	550
Tankers.....	50	100	100	125
Refineries.....	800	950	1,075	1,050
Chemical Plants.....	650	575	550	500
Marketing.....	1,150	1,250	1,450	1,350
Other.....	350	250	265	290
<i>Total Capital Expenditures</i>	8,350	8,175	8,225	7,250
<i>Geological & Geophysical Expense and Lease Rentals</i>	715	725	665	715
COMBINED	9,065	8,900	8,890	7,965
CANADA				
Crude Oil and Natural Gas.....	500	675	650	725
Natural Gas Liquids Plants.....	75	75	165	150
Pipe Lines.....	85	50	35	75
Refineries.....	145	150	240	210
Chemical Plants.....	50	50	25	15
Marketing.....	150	150	160	150
Other.....	20	25	25	20
<i>Total Capital Expenditures</i>	1,025	1,175	1,300	1,345
<i>Geological & Geophysical Expense and Lease Rentals</i>	175	175	175	150
COMBINED	1,200	1,350	1,475	1,495

<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
<i>Million Dollars</i>						
9,590	12,415	13,765	18,295	23,860	28,680	33,675
515	510	770	960	1,915	3,780	4,030
1,230	1,230	2,460	5,995	7,575	6,660	5,780
3,775	6,550	8,900	9,240	8,675	3,700	2,950
4,955	4,865	7,720	8,725	6,910	8,290	10,675
1,350	1,175	1,995	3,145	4,500	6,375	6,650
2,825	2,480	2,215	2,160	2,180	2,670	3,240
710	770	875	1,105	1,110	1,425	1,375
<u>24,950</u>	<u>29,995</u>	<u>43,700</u>	<u>49,625</u>	<u>56,725</u>	<u>61,580</u>	<u>68,375</u>
 1,540	 1,700	 2,185	 2,325	 2,535	 3,395	 4,035
<u>26,490</u>	<u>31,695</u>	<u>45,885</u>	<u>51,950</u>	<u>59,260</u>	<u>64,975</u>	<u>72,410</u>
 5,740	 7,290	 11,225	 9,055	 13,135	 14,855	 17,325
175	150	225	325	325	325	325
300	450	1,400	3,500	3,625	1,800	750
125	100	200	225	275	500	600
900	1,050	1,775	2,100	1,575	1,200	1,750
450	425	825	1,500	2,200	2,500	2,300
1,100	850	650	650	625	775	950
260	325	325	370	325	445	475
<u>9,050</u>	<u>10,640</u>	<u>16,625</u>	<u>17,725</u>	<u>22,085</u>	<u>22,400</u>	<u>24,475</u>
 740	 850	 1,130	 1,195	 1,375	 1,645	 1,975
<u>9,790</u>	<u>11,490</u>	<u>17,755</u>	<u>18,920</u>	<u>23,460</u>	<u>24,045</u>	<u>26,450</u>
 850	 1,000	 1,150	 1,125	 1,550	 2,900	 3,200
100	75	150	150	150	125	150
60	80	75	160	135	350	135
325	290	400	410	325	375	400
10	15	30	70	75	125	125
150	155	190	175	175	175	165
30	35	80	120	45	75	65
<u>1,525</u>	<u>1,650</u>	<u>2,075</u>	<u>2,210</u>	<u>2,455</u>	<u>4,125</u>	<u>4,240</u>
 150	 175	 225	 200	 250	 450	 500
<u>1,675</u>	<u>1,825</u>	<u>2,300</u>	<u>2,410</u>	<u>2,705</u>	<u>4,575</u>	<u>4,740</u>

SCHEDULE 4 CAPITAL AND EXPLORATION EXPENDITURES (Continued)

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>
	<i>Million Dollars</i>			
VENEZUELA				
Crude Oil and Natural Gas	175	200	205	210
Natural Gas Liquids Plants	10	25	25	5
Pipe Lines	5	15	20	10
Refineries	40	95	35	45
Chemical Plants	0	0	0	0
Marketing	5	5	10	5
Other	5	0	5	5
<i>Total Capital Expenditures</i>	240	340	300	280
<i>Geological & Geophysical</i>				
<i>Expense and Lease Rentals</i>	15	20	15	30
COMBINED	255	360	315	310
OTHER WESTERN HEMISPHERE				
Crude Oil and Natural Gas	350	325	360	525
Natural Gas Liquids Plants	50	10	10	5
Pipe Lines	200	125	60	220
Refineries	275	400	400	650
Chemical Plants	150	175	100	75
Marketing	100	100	100	150
Other	100	65	130	100
<i>Total Capital Expenditures</i>	1,225	1,200	1,160	1,725
<i>Geological & Geophysical</i>				
<i>Expense and Lease Rentals</i>	75	75	85	75
COMBINED	1,300	1,275	1,245	1,800
WESTERN EUROPE				
Crude Oil and Natural Gas	250	250	300	500
Natural Gas Liquids Plants	25	25	50	75
Pipe Lines	175	75	75	150
Refineries	900	850	1,050	1,400
Chemical Plants	350	350	725	800
Marketing	825	825	900	1,000
Other	100	105	160	225
<i>Total Capital Expenditures</i>	2,625	2,480	3,260	4,150
<i>Geological & Geophysical</i>				
<i>Expense and Lease Rentals</i>	125	125	100	75
COMBINED	2,750	2,605	3,360	4,225

<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
<i>Million Dollars</i>						
150	200	290	240	250	375	700
5	5	15	10	40	5	5
5	5	10	0	15	10	20
30	10	20	15	10	0	175
0	0	0	0	0	0	0
0	0	0	10	5	20	25
5	0	0	15	15	30	60
<u>195</u>	<u>220</u>	<u>335</u>	<u>290</u>	<u>335</u>	<u>480</u>	<u>985</u>
25	25	30	30	10	50	60
<u>220</u>	<u>245</u>	<u>365</u>	<u>320</u>	<u>345</u>	<u>530</u>	<u>1,045</u>
550	575	925	950	1,175	1,100	1,900
0	50	50	75	75	200	250
175	75	260	625	750	425	1,550
475	550	1,025	1,250	1,100	1,050	1,000
15	20	100	150	475	950	1,075
125	100	125	150	150	175	225
60	65	50	75	100	200	175
<u>1,400</u>	<u>1,435</u>	<u>2,535</u>	<u>3,275</u>	<u>3,825</u>	<u>4,100</u>	<u>6,175</u>
75	75	150	150	125	150	200
<u>1,475</u>	<u>1,510</u>	<u>2,685</u>	<u>3,425</u>	<u>3,950</u>	<u>4,250</u>	<u>6,375</u>
650	1,300	2,375	3,600	4,200	5,275	5,975
50	25	40	50	50	225	200
400	350	475	1,000	1,100	875	950
1,500	1,550	2,250	2,350	1,450	2,000	2,500
800	600	850	1,100	1,200	1,300	1,500
825	800	750	700	725	875	1,100
225	200	180	250	225	325	250
<u>4,450</u>	<u>4,825</u>	<u>6,920</u>	<u>9,050</u>	<u>8,950</u>	<u>10,875</u>	<u>12,475</u>
125	175	225	300	325	450	475
<u>4,575</u>	<u>5,000</u>	<u>7,145</u>	<u>9,350</u>	<u>9,275</u>	<u>11,325</u>	<u>12,950</u>

SCHEDULE 4 CAPITAL AND EXPLORATION EXPENDITURES (Continued)

	1968	1969	1970	1971
	Million Dollars			
AFRICA				
Crude Oil and Natural Gas.....	475	525	450	525
Natural Gas Liquids Plants.....	100	50	75	135
Pipe Lines.....	80	110	100	80
Refineries.....	40	90	85	100
Chemical Plants.....	25	0	0	5
Marketing.....	60	50	75	100
Other.....	5	0	5	30
Total Capital Expenditures.....	785	825	790	975
Geological & Geophysical Expense and Lease Rentals.....	75	85	100	150
COMBINED.....	860	910	890	1,125
MIDDLE EAST				
Crude Oil and Natural Gas.....	275	325	275	450
Natural Gas Liquids Plants.....	25	5	5	25
Pipe Lines.....	85	210	75	65
Refineries.....	150	100	140	125
Chemical Plants.....	55	10	25	40
Marketing.....	25	25	25	25
Other.....	10	55	20	95
Total Capital Expenditures.....	625	730	565	825
Geological & Geophysical Expense and Lease Rentals.....	50	50	50	50
COMBINED.....	675	780	615	875
FAR EAST				
Crude Oil and Natural Gas.....	175	250	300	400
Natural Gas Liquids Plants.....	50	50	25	100
Pipe Lines.....	25	25	35	50
Refineries.....	600	575	975	1,175
Chemical Plants.....	200	150	100	100
Marketing.....	350	400	500	600
Other.....	25	50	115	75
Total Capital Expenditures.....	1,425	1,500	2,050	2,500
Geological & Geophysical Expense and Lease Rentals.....	100	125	150	150
COMBINED.....	1,525	1,625	2,200	2,650
FOREIGN FLAG TANKERS	1,600	1,950	2,475	2,750

<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
<i>Million Dollars</i>						
500	500	750	825	1,000	950	1,275
100	125	140	175	200	600	900
90	55	50	250	525	525	625
200	165	150	250	375	900	1,175
0	5	25	50	150	300	400
100	100	75	100	125	175	200
15	25	25	25	50	100	75
<u>1,005</u>	<u>975</u>	<u>1,215</u>	<u>1,675</u>	<u>2,425</u>	<u>3,550</u>	<u>4,650</u>
175	125	150	200	175	300	375
<u>1,180</u>	<u>1,100</u>	<u>1,365</u>	<u>1,875</u>	<u>2,600</u>	<u>3,850</u>	<u>5,025</u>
500	850	975	1,000	1,375	1,925	1,550
10	5	25	25	675	1,400	1,500
140	130	120	350	1,250	2,150	1,400
225	300	450	400	925	1,250	2,050
25	30	40	50	150	900	1,000
25	25	25	25	25	50	50
50	50	135	175	275	125	100
<u>975</u>	<u>1,390</u>	<u>1,770</u>	<u>2,025</u>	<u>4,675</u>	<u>7,800</u>	<u>7,650</u>
50	50	50	50	75	125	150
<u>1,025</u>	<u>1,440</u>	<u>1,820</u>	<u>2,075</u>	<u>4,750</u>	<u>7,925</u>	<u>7,800</u>
650	700	1,075	1,500	1,175	1,300	1,750
75	75	125	150	400	900	700
60	85	70	110	175	525	350
1,300	950	1,650	1,950	1,150	1,475	1,625
50	80	125	225	250	300	250
500	450	400	350	350	425	525
65	70	80	75	75	125	175
<u>2,700</u>	<u>2,410</u>	<u>3,525</u>	<u>4,360</u>	<u>3,575</u>	<u>5,050</u>	<u>5,395</u>
200	225	225	200	200	225	300
<u>2,900</u>	<u>2,635</u>	<u>3,750</u>	<u>4,560</u>	<u>3,775</u>	<u>5,275</u>	<u>5,675</u>
3,650	6,450	8,700	9,015	8,400	3,200	2,350

5 **EXPLORATION AND DEVELOPMENT**
SCHEDULE EXPENDITURES — UNITED STATES — 1967-1977
(Excludes Natural Gas Liquids Plants)

	<u>1968</u>	<u>1969</u>	<u>1970</u>
	<i>Million Dollars</i>		
Lease Acquisitions — Onshore	300	1,125(a)	150
Lease Acquisitions — Offshore	1,375	125	950
Total	1,675	1,250	1,100
Producing Wells	2,150	2,325	2,160
Dry Holes	850	950	850
Total Capitalized	4,675	4,525	4,110
Geological & Geophysical Expense	575	575	525
Lease Rentals	140	150	140
<i>Total Exploration & Development Expenditures</i>	5,390	5,250	4,775
	<u>1971</u>	<u>1972</u>	<u>1973</u>
Lease Acquisitions — Onshore	200	200	500
Lease Acquisition — Offshore	100	2,275	3,100
Total	300	2,475	3,600
Producing Wells	2,095	2,330	2,705
Dry Holes	790	935	985
Total Capitalized	3,185	5,740	7,290
Geological & Geophysical Expense ..	575	575	675
Lease Rentals	140	165	175
<i>Total Exploration & Development Expenditures</i> ...	3,900	6,480	8,140
	<u>1975</u>	<u>1976</u>	<u>1977</u>
Lease Acquisitions — Onshore	500	600	650
Lease Acquisitions — Offshore	1,200	2,275	1,675
Total	1,700	2,875	2,325
Producing Wells	5,515	8,055	9,645
Dry Holes	1,840	2,205	2,885
Total Capitalized	9,055	13,135	14,855
Geological & Geophysical Expense ..	980	1,150	1,400
Lease Rentals	215	225	245
<i>Total Exploration & Development Expenditures</i> ...	10,250	14,510	16,500
	<u>1978</u>		
Lease Acquisitions — Onshore	700		
Lease Acquisitions — Offshore	1,850		
Total	2,550		
Producing Wells	10,875		
Dry Holes	3,900		
Total Capitalized	17,325		
Geological & Geophysical Expense ..	1,700		
Lease Rentals	275		
<i>Total Exploration & Development Expenditures</i> ...	19,300		

(a) Includes Alaska — North Slope — \$900 Million.

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